

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
COLORADO STATE OFFICE
2850 YOUNGFIELD STREET
LAKEWOOD, COLORADO 80215-7093
July 9, 1998

In Reply Refer To:
3809 (CO-933) **P**

Instruction Memorandum No. CO-98-043
Expires: 09-30-99

To: San Juan Resource Area

From: State Director, Colorado

Subject: Removal Action - Forest Queen Acidic Mine Drainage

Please proceed with the removal action as given in the attached Removal Action Memorandum.

If you have any questions, please contact Stephanie Odell at 970-385-1353.

Signed by	Authenticated by
Brian Bernard	Sharon Deuter
Acting, State Director	EMS Operator

Attachment

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In Reply Refer To:
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REMOVAL ACTION MEMORANDUM

To: Interested Parties
From: State Director
Subject: Time-Critical Removal Action - Forest Queen Acidic Mine Drainage

I PURPOSE

This Removal Action Memorandum documents, explains, and approves the decision to undertake treatment of the Forest Queen acidic mine drainage. The Forest Queen mine is located partially on public lands administrated by the Bureau of Land Management (BLM), San Juan Resource Area and partially on lands owned by San Juan County. The cleanup is a "time-critical removal action" as defined below. The Forest Queen is located approximately 4.2 miles northeast of Silverton adjacent to State Route 110 in San Juan County, Colorado. The legal location of the adit is T. 42 N., R. 6 W., sec. 30, SE 1/4, New Mexico Principal Meridian and the geographic coordinates are 37 degrees 51' 58" N latitude, 107 degrees 33' 54" W longitude.

II AUTHORITY

The authority to undertake treatment of the Forest Queen acidic mine drainage is given by two statutes, as follows:

The Secretary of the Interior is required by the Federal Land Policy and Management Act (FLPMA) of 1976 Section 302(b) to "take any action necessary to prevent unnecessary or undue degradation of the [public] lands."

Executive Order 12580 delegates to the heads of executive departments certain duties and powers vested in the President by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Certain authorities have been re-delegated to the Director of the BLM and subsequently to the BLM State Directors. Refer to Secretarial Order No. 3201 and BLM Instruction Memorandum No. 97-14, Change 1. In particular, these documents delegate to the State Director the authority to undertake CERCLA removal actions deemed necessary to protect the public health or welfare or the environment.

The Department of the Interior policy is to "aggressively pursue potentially responsible parties (PRPs) to correct their contamination of Departmental lands and facilities or to recover the costs of cleanup" (518 Departmental Manual 2.4 D.). CERCLA provides administrative authorities for cost recovery whereas FLPMA does not provide administrative remedies, see Section 303(a).

In light of the authorities described above, BLM initiated a PRP search on the Forest Queen mine. No viable PRP has been identified to date, therefore, the BLM Colorado State Office is authorized to initiate the treatment of the Forest Queen acidic mine drainage under CERCLA.

For the upper Animas River watershed, the BLM Colorado State Office intends to limit the use of CERCLA authorities to removal actions and cost recovery. In order to support the voluntary cleanup efforts underway in the watershed, BLM Colorado State Office is not at this time pursuing the Superfund process, remedial actions, and listing on the National Priority List (NPL).

The Forest Queen is not a federally "owned and/or operated" facility for the purposes of 42 U.S.C. 9620, but the public lands on which the adit lies are under the administration of the BLM, San Juan Resource Area. Although the BLM specifically denies any liability in this situation, it will be the "lead agency" for all response actions at non-NPL sites occurring on BLM administered public lands.

III BACKGROUND

The United States Environmental Protection Agency (USEPA) notified the public of possible hazardous releases in the Upper Animas Mining District by entry in the CERCLA Information System (CERCLIS). The site identification is USEPA ID#: CO0001411347. The BLM considers the Forest Queen as an operable unit within the Upper Animas Mining District site.

The Upper Animas Mining District CERCLIS site includes public lands under the jurisdiction and control of the BLM and the US Department of Agriculture Forest Service (San Juan National Forest), private lands patented through the General Mining Law of May 10, 1872, as amended, and other private lands. The Forest Queen is partially located on a parcel of public land administered by the BLM, and

partially located on land owned by San Juan County, however the adit draining water is on BLM lands and drains across both BLM and County lands.

In the early 1990's, the Colorado Department of Public Health and Environment sampled the water quality of the upper Animas River watershed and found that some water pollutants exceed aquatic life standards. Subsequently, the Colorado Water Quality Control Commission adopted numeric and narrative standards for certain segments of the watershed. The Commission has delayed imposing the standards to provide a period for the Animas River Stakeholders Group to proceed with voluntary and community-based watershed characterization, feasibility of cleanup, and remediation. The BLM is a member of the Animas River Stakeholders Group.

Throughout the Upper Animas Mining District, the release(s) or threat(s) of release of hazardous substances is (are) evidenced by the presence of, and seepage from mine waste rock and mill tailings; absent vegetation; abnormal stream water color and chemistry, and pronounced discoloration of stream water color during storm events; oxy-hydroxide slime (often referred to as "yellowboy" by miners) covering stream beds, lack of normal stream fauna; and discharge from numerous abandoned or inactive mine adits.

The primary waste of concern at the Forest Queen is acidic mine drainage contaminated with heavy metals which flows at an estimated average rate of 10 gallons per minute or 14,400 gallons per day from the collapsed portal of the mine. BLM has compiled data from water samples taken at the site five times during the period of 1994 to 1996. A range of values for selected data taken from water sampling results includes the following: pH 5.01-5.5, specific conductance 767-995, flow 5-15.5 gal/minute, aluminum 1.7-2.09 milligrams/liter, cadmium <0.01-11 milligrams/liter, iron 23-25.73 milligrams/liter, manganese 2.4-2.49 milligrams/liter, and zinc 0.53-0.75 milligrams/liter.

Based on USEPA's 1986 Quality Criteria for Water, the cadmium values exceed the acute and chronic aquatic values and the human health value. For aluminum, the values exceed the acute and chronic values for aquatic life. For iron, the values exceed the chronic aquatic life value and human health value. For manganese, the values exceed the human health value. For zinc, the values exceed the acute and chronic aquatic life values. It should be noted that the cadmium and zinc values are hardness dependent, which may affect the acute and chronic aquatic life values. In addition, these concentrations far exceed Colorado basic stream standards for metals, class I aquatic life standards, and exceed reportable quantities under CERCLA. The administrative record for the Forest Queen contains additional data on water quality of the polluted discharge.

The BLM completed an initial evaluation of the Forest Queen acidic mine drainage and the results are reported in Removal Preliminary Assessment for Forest Queen Abandoned Mine Site signed April 18, 1997. This preliminary assessment is in the administrative record, and includes an evaluation of the appropriateness of a removal action based on criteria given at 40 CFR 300.415(b)(2). See Section IV below for a summary of the environmental threats. The preliminary assessment concludes that a removal action is appropriate, and therefore, a CERCLA Site Inspection is not considered necessary at this time.

The preliminary assessment, in particular, and the administrative record in general, should be consulted for further, detailed information on physical location, site characteristics, the release or threat of release of hazardous substances, maps and pictures, and other documentation.

The material and relevant facts of the suspected release are as follows:

Numerous mining-related sites exist on federal and private lands in the Upper Animas Mining District. The first mining in the district occurred in the 1870s. Mining peaked in the early 1900s, then declined until 1991 when the last large operation, the Sunnyside mine, closed.

Documents in the Colorado State BLM office were reviewed to determine the claim ownership history. The mine lies on the Empire No. 1 claim which was originally located by The Treasure Mountain Gold Mines & Power Company in 1919 and recorded in 1928. The claim map shows that an adit existed at that time. The site was surveyed and approved on August 21, 1930, but it was never patented. On April 27, 1979, Noranda Exploration, Inc., filed a location certificate for the owner, the Great Divide Mining and Milling Company. In a letter dated April 4, 1984, Noranda transferred all their interest in this claim to Standard Metals Corporation. From 1986 to 1991 affidavits of labor for assessment work were received from Connors Drilling Co., and Vranesh and Raisch Attorneys at Law. A decision dated November 3, 1993 invalidated the claim after rental fees were not received for 1993 and 1994, and there are currently no active claims on the site.

No historical data on mining production has been located and the dates that the mine operated are not known. As noted above, the original claim location map showed that an adit existed in 1928. This mine and surrounding mine waste is so small that it is unlikely there was much, if any, later production. A search for production information is ongoing.

Several reports in the administrative record for the Forest Queen contain additional data on water quality and quantity, soil, and sediments.

Work in progress includes the following items.

1. Developing work plans for treatment of the acid mine drainage.
2. Continuing characterization of mine wastes and wetlands located at the Forest Queen.
3. Determining applicable or relevant and appropriate requirements (ARARs) for this removal action from the USEPA, Region VIII, and Colorado Division of Public Health and Environment.
4. Compiling the administrative record.
5. Informing the community of planned actions and respond to significant comments consistent with community relations guidelines (40 CFR 300.415(m)) for removal actions.

Local citizens and citizen groups, state and local government, congressional and state legislature representatives, and other federal agencies have been, or will be, informed of the removal action by the BLM. The project manager, on-scene coordinator, or other BLM staff have met with members of the public, Animas River Stakeholders Group, San Juan County Board of Commissioners, Colorado Division of Public Health and Environment, and USEPA regarding the removal action, and these contacts will be maintained.

Additional removal actions are being planned by the BLM at other locations within the Upper Animas Mining District. These removals are not addressed by this memorandum.

THREATS TO PUBLIC HEALTH OR WELFARE AND THE ENVIRONMENT

From my review of this situation and the above documentation, I have determined that there is a potential threat to public health or welfare, or to the environment, as set forth in the National Contingency Plan at 40 CFR 300.415(b)(2). Briefly, this threat is the discharge of acidic and metal laden water to established wetlands and to the Animas River . The acidic, metal laden discharge would be harmful to human health and aquatic life should exposure occur, therefore BLM proposes to mitigate this threat by this removal action.

The BLM has inventoried more than 300 abandoned mines that are on public lands in the Upper Animas Mining District. These abandoned mines have been prioritized for cleanup based on their damage to the environment. Thirteen of these abandoned mines, including the Forest Queen, have adit discharges that are acidic and heavy-metal laden. The Forest Queen was selected for treatment because there is a high recreational use area directly adjacent to the adit drainage, to protect and improve the quality the wetlands and other natural resources that the drainage directly impacts, to minimize ecological risks, and to mitigate the visibility impacts (the drainage is highly visible from the BLM's Alpine Loop).

Relatively high concentrations of aluminum, cadmium, iron, and zinc occur in the adit drainage. As previously discussed, these metals are in high enough concentrations that they may be harmful to human health and the environment, as well as exceeding the aquatic life standards and drinking water quality standards defined by EPA and the State of Colorado .

In compliance with the BLM mandates given in part II above, I am issuing this Removal Action Memorandum, and BLM will conduct a time-critical removal action at the Forest Queen.

V PROPOSED ACTION

This proposed time-critical removal action is the treatment of the acidic mine drainage with an anaerobic bioreactor. The process for the bioreactive treatment of hard rock mine drainage is developmental, but preliminary results at other locations in the U.S. are very encouraging. BLM is proposing a pilot project design at the Forest Queen that is expected to perform well at high altitudes. This design will also be

flexible enough to allow ease for any necessary modifications, operations and maintenance over time. Since this is an innovated technology there are monitoring locations and annual reports on findings and performance will be prepared for regulatory and public review.

The bioreactor consists of two shallow ponds filled with a compost material mixed with gravel. Attached are the construction plans submitted for contracting. Large scale drawings and the work plans are available in the administrative record. The ponds will be approximately 25 ft wide on the north end, 50 ft. wide at the south end, 50 feet long, and 7 feet deep. Mine drainage will be collected in a manhole immediately in front of the mine portal, and then the drainage will be piped to the ponds. The drainage will pass through the pond contacting the compost. Within the compost, bacterial metabolic processes neutralize the acidic drainage and remove much of the metal pollutants. The bioreactor is expected to neutralize the acidity and remove a significant portion of the metal pollutants. If the removal rate of contaminants is unsatisfactory, modifications to the system can be made as necessary.

Anaerobic bioreactor technology is a new method for treating acidic mine drainage. The Forest Queen is an excellent opportunity to further develop and test this technology for application not only in the Upper Animas Mining District, but for hard-rock mining districts throughout the U.S.

The anaerobic bioreactor was selected for this removal action because the technology has promise in effectively neutralizing acidic mine drainage and removing the metal pollutants at low construction and maintenance costs. Some studies report that, once in operation, the anaerobic reactor could function for as long as 10 to 30 years with little or no maintenance. Maintenance may include such things as occasional repair of the pond, disposal and replacement of the treatment media, sampling and monitoring, fences, and maintaining the vegetation on the top of the bioreactor. The other alternative treatments considered for the Forest Queen are listed below along with the reason for rejecting the particular alternative.

1. No action.

Although the Forest Queen acidic metal laden drainage represents a small portion of the total Animas River pollutant load, it is nevertheless a source that can be treated with a modest cost. Most important, the drainage also pollutes a natural wetland that is slowly becoming inundated by metal precipitates from the Forest Queen. In addition, the Forest Queen is an opportunity to pilot test the anaerobic bioreactor technology for use elsewhere in the watershed.

2. Aerobic reactor

In aerobic reactors, acidic drainage flows through a series of shallow ponds and over shallow waterfalls (turbulent aerators). Oxygen from the air reacts with ferrous iron in the water, and through several chemical reactions, iron hydroxide precipitates out of the water. This precipitate adsorbs some of the other water pollutants. The ponds settle the precipitate to the bottom, thus removing pollutants from the mine drainage. The aerobic reactor requires little maintenance except for repair of the channels and

ponds, and the periodic removal of the precipitate sludge. This method was rejected because the selected anaerobic reactor is expected to be more efficient at metal removal.

3. Lime treatment

In lime treatment, lime is added to the acidic drainage to neutralize the water. This neutralization causes iron hydroxides to precipitate, and, similar to aerobic reactors, the precipitate adsorbs some of the other water pollutants. Precipitates settle to the bottom thus removing pollutants from the mine drainage. This method was rejected because the treatment involves a mechanical plant that requires power, lime bins and feeders, control mechanisms, and continual operation and maintenance.

The proposed action is time-critical as a planning period of at least six months does not exist before on-site activities are to be initiated. Further degradation of water quality in the adjacent wetlands and in the Animas River is neither acceptable or necessary. The time-critical designation facilitates the most practical rapid response.

This removal action is intended to be the long-term action for the Forest Queen acid mine drainage. Further action may be necessary for the mine tailing material.

Any BLM removal action within the Upper Animas Mining District will comply with all of the substantive provisions of federal and state applicable or relevant and appropriate requirements (ARARs) to the extent practical considering the exigencies of the situation, and in consultation with the USEPA and the State of Colorado. No federal, state, or local permit is required for any removal or remedial action pursuant to 42 U.S.C. 9621(e)(1). For the purposes of the BLM response actions in the Upper Animas Mining District, "on-site" is defined as BLM-administered public lands, or other suitable areas, in close proximity to the contamination, generally in the Upper Animas Mining District CERCLIS site, that the BLM deems necessary for implementation of this and other related response actions.

If statutory requirements and regulations are met, and contracts prepared in a timely manner, it is anticipated that the proposed removal action for the Forest Queen acidic mine drainage will commence in the 1998 field season. Funding is provided by a special Department of the Interior, Abandoned Mine Lands Interagency Watershed Cleanup Initiative pilot project for the upper Animas River watershed.

VI EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Should action be delayed, ongoing or potential injury will continue to BLM-administered public resources, public health or welfare, and to the environment; should action be not taken, this ongoing or potential injury will continue indefinitely. Additionally, delay of the removal activity for the Forest Queen acidic mine drainage may erode the relationship established with the Animas River Stakeholders Group and discourage the group from further efforts to address other pollution sources in the Animas River watershed.

VII OUTSTANDING POLICY ISSUES

This proposed removal action will be a positive step in moving toward improved ecosystem health in the upper Animas River watershed. It is in the best interest of the BLM, the local population, and the impacted ecosystem for this action to go forward at the Forest Queen.

A preliminary search has been completed for potentially responsible parties. Thus far no information has come to light on who performed the mining.

VIII ADMINISTRATIVE RECORD AND COMMUNITY RELATIONS

Pursuant to 40 CFR 300.415(m), Cal Joyner, San Juan Resource Area Manager, has designated Stephanie Odell as the Project Manager. I reaffirm this designation. The administrative record for this time-critical removal action will be available during regular business hours at both the San Juan Resource Area Office in Durango, Colorado, and at the offices of the Animas River Stakeholders Group in Silverton, Colorado, within 60 days of the initiation of construction. A notice of availability of the administrative record will be published in The Silverton Standard and The Durango Herald when the administrative record is made available. A public comment period of at least 30 days will be provided from the date the administrative record file is made available for public inspection. Written responses will be prepared to address significant comments on the administrative record.

IX DECISION

By this memorandum, I find that a CERCLA time-critical removal action is appropriate for the Forest Queen Acidic Mine Drainage Operable Unit, Upper Animas Mining District CERCLIS Site, to be conducted by the BLM.

An addendum to this memorandum will include all state and federal ARARs.

By copy of this Action Memorandum, I am formally notifying USEPA Region VIII and the State of Colorado of my finding of the appropriateness of a removal action at the Forest Queen._

Ann J. Moorgan

Date

State Director